Examples of Binomial Probability

Example taken from Kellemier's The Joy of Statistics text book.

Fourteen percent of U.S. homes have no land-lines but at least one cell phone (Carey & Carter, 2008). Suppose we sample 16 U.S. homes.

1. What is the probability that exactly two of the sampled homes will have no land-lines but at least one cell phone?
2. What is the probability that less than five of the sampled homes will have no land-lines but at least one cell phone?
3. What is the probability that at least three of the sampled homes will have no land-lines but at least one cell phone?

To begin let us define that:

x = the number of homes with no land-lines but at least one cell phone

n = 16 ; the total number of homes that we are sampling

p = 0.14 ; the given percentage/ probability

1. Find P(x = 2):

binompdf (16, .14, 2) = 0.2847184658 or ≈ 28.47%

2. Find P(x < 5):

binomcdf (16, .14, 4) = 0.9381821643 or ≈ 93.82%

3. Find P(x≥3):

P (x ≥ 3) = 1 – P(x < 3) = 1 – P(x ≤ 2) ; Thus:

binomcdf (16, .14, 2) = .3925521889